

### **REMARKS**

The Examiner is thanked for extending the courtesy of a telephone interview to the Applicants' representatives.

#### **I. TELEPHONE INTERVIEW**

On October 18, 2005, Examiner Truong conducted a telephone interview with Applicants' representatives Brian D. Hickman and Stoycho D. Draganoff. Claims 1, 7, and 8 were discussed during the interview. The prior art discussed was Davies et al., U.S. Patent No. 5,682,537 ("DAVIES") and Iba et al., U.S. Patent No. 5,835,766 ("IBA"). An agreement was not reached.

Specifically, the use of TimeStamps described in col. 12, lines 31-46 of DAVIES was discussed with respect to the feature of Claims 1 and 7 of filtering out candidates based on a CAN-BE-VICTIM flag. The transaction priority described in col. 12, lines 46-52 of IBA was discussed with respect to the feature of Claims 1 and 8 of filtering out candidates based on resource priority.

#### **II. STATUS OF CLAIMS**

No claims have been added, canceled, or amended. Hence, Claims 1-5, 7-9, 13-23, 25-27, and 31-40 are pending in the application.

#### **III. SUMMARY OF THE REJECTIONS**

Claims 1, 4-5, 7-9, 13-14, 17-19, 22-23, 25-27, 31-32, and 35-40 have been rejected as allegedly unpatentable under 35 U.S.C. § 103(a) over Iba et al., U.S. Patent No. 5,835,766

(“IBA”) in view of Davies et al., U.S. Patent No. 5,682,537 (“DAVIES”).

Claims 2-3, 15-16, 20-21, and 33-34 have been rejected as allegedly unpatentable under 35 U.S.C. § 103(a) over IBA in view of DAVIES, and further in view of Porter et al., U.S. Patent No. 6,332,023 (“PORTER”).

#### IV. REJECTIONS BASED ON THE CITED ART

##### A. Independent Claim 7

Claim 7 has been rejected as allegedly unpatentable under 35 U.S.C. § 103(a) over IBA in view of DAVIES. The rejection is respectfully traversed.

Claim 7 includes the feature of

wherein the step of filtering further includes removing from said plurality of candidates any candidates that have a **CAN-BE-VICTIM flag** that indicates the candidate cannot be a victim.

Thus, in Claim 7 one of the factors taken into account in whether to consider selecting a candidate as a victim for resolving a deadlock is a CAN-BE-VICTIM flag that indicates whether or not the candidate can be considered in the selection of a deadlock victim. This feature of Claim 7 is not shown or in any way suggested by IBA or DAVIES.

Moreover, nothing in IBA or DAVIES teaches, describes, or suggests anything that is equivalent to the CAN-BE-VICTIM flag featured in Claim 7.

It is significant that the step:

wherein the step of filtering further includes removing from said plurality of candidates any candidates that have a **CAN-BE-VICTIM flag** that indicates the candidate cannot be a victim.

necessarily takes place after the step:

initially establishing a plurality of resources involved in said deadlock as a set of candidates to be said victim;

The order of these step is a logical necessity, since it would be impossible to remove a member (i.e. candidate) from a set (e.g. the initially established “plurality of candidates”) before the set is even formed. The fact that these are separate and distinct steps, and that they necessarily take place in a certain order, is critical in appreciating why the claims are allowable over all of the cited art.

Specifically, the Office Action asserts that the use of TimeStamps as described in col. 12, lines 31-51 of DAVIES corresponds to:

wherein the step of filtering further includes removing from said plurality of candidates any candidates that have a **CAN-BE-VICTIM flag** that indicates the candidate cannot be a victim.

This is incorrect. Specifically, DAVIES does not use TimeStamps to “filter” or “remove” candidates from an already established set of “victim candidates”. Rather, **at the time that DAVIES looks at the timestamps, DAVIES system has not yet even determined whether there is a deadlock, much less established a set of victim candidates for breaking a deadlock.**

In col. 12, lines 31-51 DAVIES states:

The Queued-Requests List 126 is searched at Step 204. **Only those Lock Requests 128a-c that have been queued for a predetermined period of time are reported to the Deadlock Detector 92**, rather than reporting all Lock Requests on the Queued-Requests List. Because the Queued Requests List is ordered according to the Time Stamps of the Lock Requests 128a-c, processing of the Queued Requests List begins at the head of the list and proceeds until a Lock Request is encountered whose Time Stamp indicates that its time in the list is less than the Request Time-out period. Referencing FIG. 6, Lock Request 128a is the first Lock Request that is checked. If its Time Stamp indicates that it has been queued longer than the Request Time-out Period, an entry is placed in the Queued Requests Packet, as indicated by Step 206, that will be sent to the Deadlock Detector.

**Once all the timed-out Lock Requests are identified and entries placed in a Queued-Requests Packet, the Packet is sent from a Deadlock Preprocessor element 74a-d to the Deadlock Detector 92** using common message passing techniques. (Emphasis added.)

The Queued-Requests List described in the above passage is not a list of candidates for a deadlock victim, but “is used for managing requests for locking records for which there is presently a conflicting lock held by another [sic] transaction.” (DAVIES, col. 10, lines 36-38). Moreover, the above passage makes it clear that the TimeStamp of each lock request placed on the Queued-Requests List is used to determine whether that lock request “has been queued longer than the Request Time-out Period” (DAVIES, col. 12, lines 42-43); if a particular lock request has been on the Queued-Requests List longer than the Request time-out period, then that particular lock request is placed in a Queued-Requests Packet which is sent to a Deadlock Detector **that determines whether that lock request is involved in a deadlock.** (DAVIES, col. 12, lines 44-51.) Therefore, within the DAVIES system, the TimeStamps are used to determine whether there is a deadlock. Determining whether there is a deadlock necessarily comes before establishing an initial set of candidate victims. Establishing an initial set of candidate victims necessarily comes before removing candidates from the candidate pool.

Furthermore, once a the Deadlock Detector of DAVIES identifies a deadlock, the Deadlock Detector resolves the deadlock by releasing ALL transactions involved in the deadlock (see DAVIES col. 15, lines 19-22) and does NOT take into account any TimeStamps that may be associated with lock requests issued by the transactions. Thus, DAVIES does not perform **any** “filtering” of the victim candidate set, much less filtering based on a CAN BE VICTIM flag.

Thus, at most DAVIES may be describing that the TimeStamp of a lock request may be used to make a determination of whether the transaction that issued the lock request is involved in a deadlock. However, neither the above passage nor anything else in DAVIES teaches, describes, or suggests that a TimeStamp may be used to eliminate a transaction, which is involved in a deadlock, from being considered as a potential victim for resolving a deadlock. In

contrast, Claim 7 includes the feature of filtering a plurality of victim candidates by removing from the plurality of candidates any candidates that have a CAN-BE-VICTIM flag that indicates the candidate cannot be a victim.

The other passage from DAVIES cited in the Office Action as allegedly showing the above feature of Claim 7 similarly fails to disclose the feature. In col. 15, lines 56-58, DAVIES describes that an object lock request from a processing activity such as a queued lock-requester may be enqueued. However, nothing in this passage teaches, describes, or suggests that a queued lock-requester may be eliminated from being considered as a deadlock victim based on something equivalent to a CAN-BE-VICTIM flag as featured in Claim 7.

Furthermore, as the passage in col. 12, lines 31-51 of DAVIES suggests, the lock requests on the Queued-Requests List are reported to the Deadlock Detector. “[T]he Deadlock Detector waits for a predetermined period of time, which is specified by the Lock Reporting Period, to perform a periodic check for deadlock.” (DAVIES, col. 13, lines 59-61.) It therefore follows that the lock requests on the Queued-Requests List necessarily are entered in the list BEFORE a deadlock is detected by the Deadlock Detector. For this reason, the Queued-Requests List is not even equivalent to a list of plurality of candidates involved in a deadlock as featured in Claim 7.

For the reasons given above, IBA and DAVIES, whether taken alone or in combination, do not teach all of the features recited in Claim 7. Thus, the Applicants respectfully submit that Claim 7 is patentable under 35 U.S.C. § 103(a) over IBA in view of DAVIES.

B. Independent Claim 8

Claim 8 has been rejected as allegedly unpatentable under 35 U.S.C. § 103(a) over IBA in view of DAVIES. The rejection is respectfully traversed.

Claim 8 recites the feature of:

wherein the step of filtering further includes removing from said plurality of candidates the candidates whose **resource priority** is higher than the resource priority of at least one of the other candidates.

Thus, in Claim 8 one of the factors taken into account in whether to consider selecting a candidate as a victim for resolving a deadlock is the resource priority of resource held by a candidate. It is respectfully submitted that this feature of Claim 8 is not shown or in any way suggested by IBA or DAVIES.

It appears that this rejection is similar to the CANNOT BE VICTIM rejection in that both rejections resulted from blurring a very important distinction. In this case, the significant distinction to keep in mind is the difference between resources and possessory entities.

In particular, nothing in IBA or DAVIES shows or suggests that **resources** have priorities, much less that the **priority of a resource** involved in a deadlock is in any way relevant to eliminating a candidate from being considered for a deadlock victim. The priorities discussed in IBA are priorities of transactions and not the priorities of the resources that may be accessed by these transactions.

It is respectfully submitted that there is a fundamental difference between transactions that access resources and resources that are being accessed by the transactions. Specifically, the present specification refers to possessory entities, such as for example processes or transactions, which are capable of acquiring or owning a resource (see Application, page 1, lines 10-13; Fig. 1b), and the resources are the things which the possessory entities can acquire or get hold of (see Application, page 7, lines 13-17; Fig. 1b). Thus, it is clear that the resource priority referred to in Claim 8 is a priority associated with a resource that is being accessed by a possessory entity such as a transaction.

In contrast, the passage from IBA (col. 12, lines 46-52) cited by the Office Action clearly indicates that the priority based on which a transaction is selected as a deadlock victim

is a priority **associated with a transaction**, which in the context of Claim 8 would be considered a possessory entity and not a resource.

As a practical matter, the operation of a system which takes into account the **priority of a resource** held by a possessory entity to determine the selection of a deadlock victim is different than the operation of a system which takes into account a priority associated with the possessory entity itself. For example, suppose that a certain resource involved in a deadlock has a very low priority. Further suppose that the resource is held by a transaction with a very high priority. If the priority of the transaction is used to determine the victim for resolving the deadlock (as is done in the IBA system), then the transaction is not going to be selected as the deadlock victim. However, if the selection of the deadlock victim is based on the priority of the resource (such as featured in Claim 8), then the transaction will be selected as the deadlock victim even though the transaction has a very high priority, because the resource held by the transaction is of low priority and thus deemed not important or significant.

For the reasons given above, IBA and DAVIES, whether taken alone or in combination, do not teach all of the features recited in Claim 8. Thus, the Applicants respectfully submit that Claim 8 is patentable under 35 U.S.C. § 103(a) over IBA in view of DAVIES.

It is important to note that the Applicants are not saying that it is always erroneous to call transactions “resources”. In fact, there may be a context in which it is proper to refer to a “transaction” as a resource. However, in the context of the present claims, saying that “transactions” can be the claimed “resources” is erroneous and nonsensical. For example, there are no “possessory entities” that attempt to obtain locks on/access to transactions. When a deadlock occurs, it is not because something is trying to access transactions, it is because transactions are trying to access resources (such as disk blocks).

C. Independent Claim 1

Claim 1 has been rejected as allegedly unpatentable under 35 U.S.C. § 103(a) over IBA in view of DAVIES.

Claim 1 includes features similar to the features of Claims 7 and 8 discussed above. In particular, Claim 1 features performing a first filtering pass that removes candidates from the set of candidates to be a victim based on CAN-BE-VICTIM flags associated with the candidates, and performing a second filtering pass that removes candidates from the set of candidates to be a victim based on priorities associated with the candidates, where the candidates for a victim are resources.

Thus, the Applicants respectfully submit that Claim 1 is patentable under 35 U.S.C. § 103(a) over IBA in view of DAVIES for at least the reasons given above with respect to Claims 7 and 8.

D. Independent Claims 19, 25, and 26

Claims 19, 25, and 26 have been rejected as allegedly unpatentable under 35 U.S.C. § 103(a) over IBA in view of DAVIES.

Independent Claims 19, 25, and 26 include features similar to the features of Claims 1, 7, and 8 discussed above. For this reason, the Applicants respectfully submit that Claims 19, 25, and 26 are patentable under 35 U.S.C. § 103(a) over IBA in view of DAVIES for at least the reasons given above with respect to Claims 1, 7, and 8.

E. Dependent Claims 2-5, 9, 13-18, 20-23, 27, and 31-40

Claims 4-5, 9, 13-14, 17-18, 22-23, 27, 31-32, and 35-40 have been rejected as allegedly unpatentable under 35 U.S.C. § 103(a) over IBA in view of DAVIES. Claims 2-3, 15-16, 20-21, and 33-34 have been rejected as allegedly unpatentable under 35 U.S.C. § 103(a) over IBA in view of DAVIES, and further in view of PORTER.



Each of Claims 2-5, 9, 13-18, 20-23, 27, and 31-40 is dependent upon one of independent Claims 1, 7, 8, 19, 25, or 26, and thus includes each and every feature of its corresponding independent claim. Furthermore, in rejecting Claims 2-3, 15-16, 20-21, and 33-34 the Office Action relies explicitly on IBA or DAVIES, and not on PORTER, to show the features discussed above with respect to Claims 1, 7, 8, 19, 25, and 26. Because IBA and DAVIES do not teach the subject matter of Claims 1, 7, 8, 19, 25, and 26, any combination of IBA and DAVIES with PORTER necessarily fails to teach the complete combination recited in any dependent claim of Claims 1, 7, 8, 19, 25, and 26. Thus, each of Claims 2-5, 9, 13-18, 20-23, 27, and 31-40 is allowable for the reasons given above for Claims 1, 7, 8, 19, 25, and 26.

In addition, each of Claims 2-5, 9, 13-18, 20-23, 27, and 31-40 introduces one or more additional features that independently render it patentable. However, due to the fundamental differences already identified, to expedite the positive resolution of this case a separate discussion of those features is not included at this time. Therefore, it is respectfully submitted that Claims 2-5, 9, 13-18, 20-23, 27, and 31-40 are allowable for at least the reasons given above with respect to Claims 1, 7, 8, 19, 25, and 26.

## V. CONCLUSION

The Applicants believe that all issues raised in the Office Action have been addressed. Further, for the reasons set forth above, the Applicants respectfully submit that allowance of the pending claims is appropriate. Reconsideration of the present application is respectfully requested in light of the amendments and remarks herein.

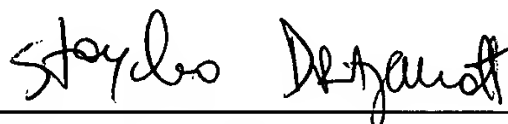
The Examiner is respectfully requested to contact the undersigned by telephone if it is believed that such contact would further the examination of the present application.

A petition for extension of time, to the extent necessary to make this reply timely filed, is hereby made. If applicable, a law firms check for the petition for extension of time fee is enclosed herewith. If any applicable fee is missing or insufficient, throughout the pendency of this application, the Commissioner is hereby authorized to charge any applicable fees and to credit any overpayments to our Deposit Account No. 50-1302.

Respectfully submitted,

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